

PROBLEM 7.12. Recall (Problem 4.47) that the single-user matched filter is asymptotically optimal in the sense that

$$\lim_{\sigma \rightarrow \infty} \frac{\sigma}{A_k} (P_k^c(\sigma) - P_k(\sigma)) = 0.$$

For a two-user synchronous two-stage detector with decorrelating first stage, find

$$\lim_{\sigma \rightarrow \infty} \frac{\sigma}{A_1} (P_1^{dd}(\sigma) - P_1(\sigma)).$$

PROBLEM 7.13. Show that the near-far resistance of the synchronous two-user two-stage detector with decorrelating first stage is given by

$$\bar{\eta}_1^{dd} = \frac{1 - \rho^2}{1 + 3\rho^2}$$